OOH, TOM! I JUST LOVE THE WAY YOU HANDLE THAT SPECTRUM!

WATCH IT KELLY... YOU'RE RUMPLING MY FORMAT!

FORMAT - THE HIGH FLIER

CONTENTS

Vol.6 Nº10.   **June 1993.**

NEWS ON 4

WEST COAST OFFER £50 TRADE-IN

Your old Speccy could be worth £50 if you trade it in for a brand new SAM between now and the end of July.

Provided your Spectrum is in full working order and is complete with power supply and manual you can have a SAM Coupe for just £149.95 plus shipping. See their advert in this issue for more details.

SONY BUYS PSYGNOSIS

One of the UK's leading software houses is now under new ownership. Psygnosis, famous for Lemmings, has been taken over by Japanese mega-company Sony in part of their move into the European Games Market.

Sony Electronic Publishing wants to come in big, with development concentrating on consols and the new CD based market. By buying Psygnosis Sony acquires the experienced management team it needs to lead its European push by appointing Jon Ellis and Ian Hetherington (co-founders of Psygnosis) as joint managing directors. This gives them a powerful market position in Europe right from day one.

Sony were quick to point out that they were not simply 'gobbling up Psygnosis' and changing the name on the door. The company will continue under its own name and with almost complete autonomy - bring its own products to market - while developing products and technology for Sony's wider European (and in some cases World) markets.

ONE UP FOR BT

Got over the confusion of the 071/081 London numbers yet? Yes? Well get ready for even more fun in 1995.

On the 16th April 1995 most STD dialing codes are set to change in the biggest revamp of the dialing system since Subscriber Trunk Dialing was introduced many moons ago.

Most area codes will change by simply having a 1 inserted after the leading 0. So 0452 for Gloucester will become 01452. Leeds, Sheffield, Nottingham, Leicester and Bristol all undergo even more radical change - Leeds for instance changes from 0532 to 01132.

BT's publicity will soon be swinging into full gear. Business users have already received advanced information so they can plan the printing of stationary etc. While the old numbers don't switch off until 1995 many of the new numbers will be valid as early as Easter 1994 and testing is starting very soon.

REVELATION LAUNCH SCHOOL LICENSE

Recognizing the special needs of schools Exeter software company Revelation have launched a special license scheme to cover some of its products.

Instead of the school needing to buy one copy of a program for each of the machines it is to run on they can now buy a site license that covers up to ten computers. For instance, Revelation will supply a 2-to-10 machine site license for the CAMPION spreadsheet for a single payment of £60, this gives the school two copies of the manual and two copies of the master disc for the program. The program can then be copied onto as many working discs as the teaching staff feel is needed (even one per child if that makes life easy for the teacher). As long as the discs are kept at the school (no letting the kids take copies home) and as long as there are no more than ten computers in use (Any mix of Spectrums and SAMs in this case) then £60 is all it will

cost.

At this time four products are covered on SAM, Campion, Secretary, Comet Assembler and Sound Machine. On the Spectrum there is only the Campion spreadsheet at the moment. Each require a separate license (prices vary per product) and schools should write to Revelation if they are interested.

AMIGA PRICE CUTS?

Following poorer than expected Christmas sales, and even poorer sales so far this year, Commodore have announced price cuts to their A600 version of the Amiga.

Between £100 and £150 have been cut from the various packages but only through independent retailers. This means that many High Street Multiples will still undercut if they have their way.

Amid reports that the Amiga magazine field looks set for a few mergers this is another blow for the machines claim to the 16 bit home computer crown.

Commodore are also facing up to life with a new management team following the loss of its second managing director in ten months. Kelly Sumner quit in April to be replaced by David Pleasance and Colin Proudfoot who will act as joint general managers of the UK company. Proudfoot is also a vice president of the US parent company.

SPECTRUM PD

Because of the low prices charged over the years for commercial Spectrum software PD (Public Domain) has never really taken of. On other machines, where software is expensive (like PCs and the Amiga) PD is very big.

However, now that commercial support for the Spectrum is so sadly on the wane, PD looks set to grow in influence. The concept of PD is simple, the programmer gives his work into the Public Domain - anyone can copy the program(s) freely provided they make no changes to the code. PD librarys like Prism can charge a nominal duplication and handling fee but are not supposed to make a profit from selling PD software.

Prism PD is run by Martyn Sherwood, who has now taken over the old Total PD operation run by Steve Anderson. Prism claim a list of over 400 titles available with prices working out as low as 16 pence per program on some packs.

The variety of programs available includes demos, utilities, Word Master fonts, emulators (for running on PCs and Amiga - both supplied as shareware) and lots more. A full list can be obtained by sending an SAE to Prism PD, 13 Rodney Close, Bilton, Rugby, CV22 7HJ.

Prism are also on the look out for more material to expand the library even further and any programmers are invited to get in touch with Martyn.

CONSOL GAME SALES DROP

Reports that the sales of cartridge games for the colsols (Nintendo and Sega) are dropping has been confirmed by local distributors and retailers.

On average three games were sold during the period Jan-Mar 1992 for each consol sold over Christmas 1991. The figure this year is less than two. It would appear that price is the main cause of poor sales.

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News Credits: Andy James. G.Little

URGENT we need your news. Anything you think other people should know about. Items printed earn contributor 3 months extra subscription (please claim when renewing).

'I only pointed out you had missed a bit.'

The Editor Speaks

Support for our proposed gathering of Spectrum and SAM enthusiasts is growing. If you missed last months editorial, the idea is for a small show - with a few stands selling bits and pieces - plus meetings and possibly lectures (if I can find people to give them). I'm aiming for the last Saturday in September or the first in October - firm details as soon as we book the hall. The cost is yet to be worked out but will probably be £2 to £4 per person. In order to judge the room needed for this get-together we need an idea of the interest. If you would like to attend then drop us a line very soon. Send no money now, just register an interest.

There seem to have been lots of problems with the post in the Exeter area over the last month. We had many telephone calls from readers whose FORMATs had not arrived (well after we had posted them). Revelation also reports major problems with both incoming and outgoing mail. It seems the problem has been down to the new hi-tech sorting office which has just opened on the M5 side of the city. Test quantities of mail went through - no probs. Then the big day when the old office closed down. BANG... New machinery throws a wobbler, old machinery already dismantled, result = chaos.

After drafting in 50 extra staff, to sort by hand, things are getting delivered - up to 14 days late. Still they are gradually sorting things out (did I really say that?) And the promise is that everything will be back to normal by the end of the first week in June.

Following my comments in a recent issue on writing orders clearly, I have had a couple of letters asking why we wait until FORMAT goes out before dispatching orders.

Good question. Well it all started back in 1989 when we started losing anything up to 30% of what the Royal Mail describe as IPP's (that's Interesting Postal Packets to you). For a while we were forced to stop selling software and the like - because we could not get compensation from RM for our customers. When we did reintroduce the 'Readers Service Page' we decided to consolidate the mailing into one (or sometimes two) batches a month. This meant that if we suffered a high loss rate again then RM could be forced into taking action. We do however make exceptions. Items like keyboards and power supplies generally go out within a week - especially if you say that your existing one is already broken.

Now, even though Royal Mail has improved over the last few years, it still makes sense to process orders in as large a batch as possible. Once FORMAT is off to the printers each month the label system swings into action. First, Jenny types in the updates (renewals, change of address, etc). Then I run a program that sets a flag to tell us who needs a renewal notice (sent out, by the way, with the last two issues of FORMAT you are due) and then we enter the orders. We can then print out labels for all live members on the database, each label telling us what needs to go with the issue. The next step is to take a backup copy of the three discs the database covers (four with the Associate Membership disc) so that I can always go back to a disc and say EXACTLY what would have been on any label printed out in a particular months run - added security without undue overheads in time.

Bob Brenchley, Editor.

SHORT·SPOT
YOUR HINTS, TIPS AND PROGRAMMING IDEAS

Edited By:- John Wase.

Hi, there, folks. Firstly, I must apologise for misleading readers. Since last April's "Format", something dreadful seems to have befallen "Foiprall" of Pershore, and a couple of indignant readers have had their letters returned undelivered. Keith Guilder of Broadstairs sent me his envelope, marked "Undelivered Not Known" in a rather interesting envelope with 24 one penny stamps on it. And Alan Cox sent a similarly returned envelope with a rather forthright comment opening his letter. If anyone knows what has happened to "Foiprall", do please drop me a line.

Now back to Daniel Sheridan's Gasket. program for the Spectrum and PLUS D. Roy Burford, who looked at his disc (you remember the impassioned plea not to type it in any more in last month's "Format") has sent me a revised disc. Essentially, he says, my data are correct, but I'd slipped up over the "TO" count. Here's the program, as revised by Roy.

```
1 REM Vol6-No8. FORMAT. April 1993.
  Short Spot. p11. Daniel Sheridan
  . Gasket translated by John Wase.
2 REM Revised to ZX Spectrum+ 128K
  by B.C.R.Burford 180493-line 20 c
  ounter changed from 30218 to 3028
  0 and ultimate byte 0 removed fro
  m original line 400.
3 REM 280493-line 120, my error cor
  rected, 33 not 38.
10 CLEAR 29999
20 FOR a=30000 TO 30280
30 READ n: POKE a,n: NEXT a
40 RANDOMIZE USR 30000
50 DATA 195,31,118,66,8,203,58,56
60 DATA 18,62,2,162,238,2,61,203
70 DATA 66,40,4,132,103,24,25,133
80 DATA 111,24,21,62,1,162,203,39
90 DATA 170,230,2,238,2,61,133,111
100 DATA 62,2,162,238,2,61,132,103
110 DATA 203,67,40,13,229,217,193,121
120 DATA 72,71,205,229,34,33,88,39
130 DATA 217,8,80,201,71,197,205,51
140 DATA 117,193,5,194,117,117,201,6
150 DATA 2,197,61,193,5,194,129,117
160 DATA 167,202,168,117,6,2,197,60
170 DATA 193,5,194,142,117,203,63,205
180 DATA 250,117,205,116,117,205,250,
    117
190 DATA 205,116,117,203,39,195,180,1
    17
200 DATA 6,2,197,60,193,5,194,170
210 DATA 117,205,116,117,201,6,2,197
220 DATA 61,193,5,194,183,117,167,202
230 DATA 237,117,6,2,197,60,193,5
240 DATA 194,196,117,203,63,205,116,1
    17
250 DATA 6,2,197,20,193,5,194,210
260 DATA 117,205,250,117,6,6,197,20
270 DATA 193,5,194,222,117,205,116,11
    7
280 DATA 203,39,195,249,117,6,2,197
290 DATA 60,193,5,194,239,117,205,116
300 DATA 117,201,205,127,117,6,3,197
310 DATA 20,193,5,194,255,117,205,116
320 DATA 117,6,3,197,20,193,5,194
330 DATA 11,118,205,181,117,6,2,197
340 DATA 20,193,5,194,23,118,201,8
350 DATA 1,0,88,175,11,2,62,63
360 DATA 184,194,35,118,8,33,0,0
370 DATA 22,0,203,195,71,197,61,193
380 DATA 5,194,53,118,6,128,197,60
390 DATA 193,5,194,62,118,205,250,117
    ,201
```

Thanks, Roy: he's also looked at a further offering by Daniel, which we'll publish in due course.

Incidentally, Alan Cox of St Clears also subsequently sent in with the same information: my fingers had got crossed in line 20 and 30218 should have been 30281. A number of tidy-ups from Alan, including thanks for the Eye-teaser of March; data for the Escher staircase would unfortunately fill "ShortSpot" twice, and a note that you will need to use "RESTORE" after Andy Wright's SAM UDG/CHARS program, again featured in March's issue. And talking of SAMproblems,

John Redfern of Forest Hill, London, has a Really Useful SAMprogram, which has been hanging around for months. It is designed to allow you to compare palette colours side by side merely by typing in the colour Numbers as listed in the SAM manual. I like this one; you type in a number and the colour comes up in an arbitrary rectangular tile with a white border, overlapping the tiles you've already got. It's a reasonable size, and really lets you compare what a colour will look like on your telly or monitor.

```
10 REM **COLOUR COMPARATOR**
20 MODE 4
30 PALETTE : PAPER 0: BORDER 0: PEN
   7: CLS : CSIZE 8,9: LET yos=-18
40 GOTO title
50 LABEL start
60 FOR n=8 TO 14
70 filcol: PALETTE n,f: PEN 15: LET
   m=n-7: GOSUB ON m; 90,100,110,1
   20,130,140,150: NEXT n
80 GOTO start
90 win 15,170,100,100,15,7,n: PRINT
   PAPER n; AT 3,2;f: RETURN
100 win 31,115,70,100,15,7,n: PRINT
    PAPER n; AT 9,4;f: RETURN
110 win 60,150,70,60,15,7,n: PRINT P
    APER n; AT 5,8;f: RETURN
120 win 100,185,80,90,15,7,n: PRINT
    PAPER n; AT 1,13;f: RETURN
130 win 118,140,100,60,15,7,n: PRINT
    PAPER n; AT 6,15;f: RETURN
140 win 140,105,70,95,15,7,n: PRINT
    PAPER n; AT 10,18;f: RETURN
150 win 170,170,105,75,15,7,n: PRINT
    PAPER n; AT 3,22;f: RETURN
160 DEF PROC filcol
170 INPUT "Fill colour (999 to Quit)
    "f
180 IF f=999 THEN STOP
190 IF f>127 THEN GOTO 170
200 END PROC
500 LABEL title: CSIZE 8,16: PRINT P
    EN 14; TAB 5;"** COLOUR COMPARAT
    OR **": CSIZE 8,9: PALETTE
510 PRINT ''' " To enable you to comp
    are     different Palette colou
    rs side by side just type in th
    e colour numbers as listed in yo
    ur SAM Manual."
520 PRINT ''' " The colours selected
    will be filled into overlapping
    boxes   enabling easy compariso
    ns to be made."
```

```
530 PRINT ''' " Illegal numbers will
    not be   allowed. To quit type (
    999)."
540 PRINT #0;"Press a key..."
550 PAUSE
555 CLS
560 GOTO start
10000 DEF PROC win x,y,h,w,i1,i2,f: DE
      FAULT i1=15,i2=0,f=3
10010 IF x-1<0 OR x>255 OR y>185 OR y-
      h<0 THEN GOTO 10050
10020 LET p=PEEK SVAR 72: PAPER f: SCR
      OLL 2,h-1,x,y-1,w+2,h-1: POKE SV
      AR 72,p
10030 PLOT PEN i1;x,y: DRAW PEN i1;w,0
      : DRAW PEN i1;0,-h: DRAW PEN i2;
      -w,0: DRAW PEN i2;0,h
10040 PLOT PEN i1;x-1,y+1: DRAW PEN i1
      ;w+2,0: DRAW PEN i1;0,-(h+2): DR
      AW PEN i2;-(w+2),0: DRAW PEN i2;
      0,h+2
10060 END PROC
10070 DEF PROC sa: SAVE "colorcomp" LI
      NE 1: VERIFY "colorcomp": END PR
      OC
```

Many thanks, John.

Now for Robert. Robert Brady, of course, of Evington, Leicester. He's sent me a whole SAMdisc full of bits: well, empty, really, as he explains, because they really are bits. The letter is dated in January, and he adds that at the time he was 13.58(ish). And yet he's spotted all sorts of interesting wrinkles. The first is that "people like Carol Brooksbank might like to know that LOCAL takes commas", like LOCAL a, b, c instead of LOCAL a: LOCAL b: LOCAL c. It saves a lot of time typing stuff in. Nice one Robert...

For those who have an interest in esoteric simulations, try Robert's Voting game for SAM, in which people are influenced by their neighbours. It defines an array, and makes each thing a different party. Each cycle, it chooses a random square and persuades its neighbour to vote similarly. Robert calls it "very interesting". I wonder what difference it would have made to the Danish Maastricht vote?

```
10 DIM a(30,20)
20 FOR n=1 TO 30
```

```
30 FOR m=1 TO 20
40 LET a(n,m)=RND(2): IF RND(8)=1 T
   HEN LET a(n,m)=3
45 IF RND(12)=1 THEN LET a(n,m)=4
50 NEXT m
60 NEXT n
65 MODE 4: CSIZE 8,8
70 PALETTE 1,16: PALETTE 2,110: PAL
   ETTE 3,32: PALETTE 4,68: PALETTE
   5,2
80 disp
90 LET x=RND(29)+1,y=RND(19)+1
100 LET px=RND(2)-1,py=RND(2)-1
110 IF px=0 AND py=0 THEN GOTO 100
120 LET nx=x-px,ny=y-py: IF nx=0 THE
    N LET nx=30
130 IF nx=31 THEN LET nx=1
140 IF ny=21 THEN LET ny=1
150 IF ny=0 THEN LET ny=20
160 LET a(x,y)=a(nx,ny): PRINT AT ny
    ,nx; PEN a(x,y)+1;""
170 GOTO 90
60000 DEF PROC disp
60010 FOR n=1 TO 30
60020 FOR m=1 TO 20
60030 PRINT AT m,n; PEN a(n,m)+1;""
60040 NEXT m
60050 NEXT n
60060 END PROC
```

Finally, "Predict". Conscript a volunteer. Ask them to provide a number: zero or one. Now input it into SAM. It depends on the volunteer, but it will usually manage to predict the next number the volunteer selects with a success rate of 70%. Robert cheerfully challenges anyone to explain its workings, but offers no prizes, claiming that it's illegal for one as youthful as he!

```
5 PRINT "PRESS R WHEN READY"
6 PAUSE : CLS #
10 DIM sub(16,2)
20 LET first=0,second=0,third=0,fou
   rth=0,sc=0,go=0
30 FOR n=1 TO 4
40 LET pred=RND(1)
60 INPUT ans
62 PRINT AT 0,0;"PREDICTION ";pred
65 shuf ans
70 IF ans=pred THEN LET sc=sc+1
80 LET go=go+1
90 PRINT AT 1,0;"SUCCESS RATE ";sc/
   go*100;"%
100 NEXT n
110 LET sum=first+2*second+4*third+8
```

```
   *fourth+1
120 LET pred=(1 AND sub(sum,2)>sub(s
    um,1))+(RND(1) AND sub(sum,2)=su
    b(sum,1))
130 REM PRINT AT 0,0;"PREDICTION ";p
    red
140 INPUT ans
145 PRINT AT 0,0;"PREDICTION ";pred
150 LET sub(sum,ans+1)=sub(sum,ans+1
    )+1
160 IF ans=pred THEN LET sc=sc+1
170 LET go=go+1
180 PRINT AT 1,0;"SUCCESS RATE ";sc/
    go*100;"%
190 shuf ans
200 GOTO 110
60000 DEF PROC shuf ans
60010 LET first=second,second=third,th
      ird=fourth,fourth=ans
60020 END PROC
```

O.K. then. How does it work? Many thanks, Robert.

Next; remember "Varprint" last month? Ted asked if anyone had written a program to plough right through the program and list all the variables cited in it. Ray Bray of our own Format Help Page writes that he has done just that, for he had exactly the same problem as Ted's. The program produces two listings, firstly by line order; useful as it gives the line in which the variable first appears. Essentially, this helps one remember how the variable originated. It prevents inventing the same variable again with a different name! The second is the more usual alphabetic listing with associated line numbers. It's written in Masterbasic for SAM, and would therefore probably adapt fairly easily to the Spectrum, particularly if one were using Beta Basic, if one used a different sort routine. It's pretty slow, working at about the rate of one line per second for long programs, and a bit quicker for shorter ones, but when used in the development of programs, there is a facility to save a variables listing as a reloadable array, and this cuts the time to produce an updated list. Just one little problem: it's too long for "Short Spot". Ray Bray, of 4 Tidworth Road, Porton, Salisbury SP4 0NG will send a copy if you send him a

formatted SAMdisc and an SAE, or just SAE for the listing, but if there is sufficient interest, we could do it as a stand-alone article. What about it, folks?

Back to Alan Cox, now. I'm looking at a letter of his written in February, in which he talks about random numbers in Spectrum and SAM. He mentions, for instance, that you can easily get pseudo-random numbers in Spectrum Basic from RANDOMIZE and RND, but that if you are writing your own machine code programs, it is less easy unless you want to hook back into the Basic routines. He also mentions Chris Dodd's program, "Web", which contains some superfluous lines, and which, as published, is rather limited. He has deduced that Chris is, like most of us, a graduate from a Spectrum, since he uses RND*255, rather than adapting RND(255). Anyway, Alan's added a few bits to Chris's program. Finally, on this business of random numbers, Alan's been reading Mike James' "Expert guide to the Spectrum", and has noticed that Mike claims that the Spectrum ROM is itself a useful source of random bytes! Alan queries this.

Well, Alan, let me comment in order. Firstly, I too have had to do some delving, for I remember a program in ZX Computing; by Gavin Smyth on page 14 of the April-May issue, 1984. This uses the ROM to generate random numbers for a space invaders game. And I'd got it on disc. The little devils chatter in a hopelessly random fashion, (an impressive use of the Speccy sound chip) and, moving regularly, space-invader fashion drop bombs randomly on home base. But when I looked it up, I found a listing of decimal data which occupied two and a half A4 pages, and a Basic code poker. And the listing had long since disappeared from my discs - all I had retained was the code. So, woe is me. If you would really like a copy, or for me to set this up as an article, then I will. But it's going to take me some time to type in.

Meanwhile, in recompense, here's a SAMversion of Chris Dodd's "web",

extended by Alan Cox.

```
  1 REM Chris Dodd's program from Sh
    ort Spot Feb 93 with some mods a
    nd tidying up
 10 MODE 1
 20 GOSUB 240
 30 GOSUB 60
 40 PAUSE 50: GOTO 10
 60 FOR a=80 TO 0 STEP -10
 70 PAUSE 25: LET r=a/(180/PI)
 80 PLOT ox-100*COS (r),oy
 90 DRAW 100*COS (r),oy+150*SIN (r)
110 PLOT 136+100*COS r,oy
120 DRAW -100*COS r,oy+150*SIN r
150 NEXT a
170 RETURN
240 BORDER 0: PEN 7: PAPER 0: CLS
250 LET ox=120: LET oy=8
260 FOR y=1 TO 20: PRINT PAPER 2; AT
    y,15;" "
270 NEXT y
280 FOR y=oy-1 TO 165 STEP 16: PLOT
    ox,y
290 DRAW 16,0: PLOT ox,y+8: DRAW 16,
    0: PLOT ox+8,y+8: DRAW 0,8
300 NEXT y
310 PLOT PEN 4;0,oy-1: DRAW PEN 4;25
    5,0
320 RETURN
9998 STOP
9999 DEF PROC sv: SAVE "web2": END PR
     OC
```

Finally, in this little piece about random numbers, there are various ways of presenting messages across the screen, such as the scrolly ones that trundle across for hours and hours saying nothing in particular, like "...love to Kate and the boys and this was programmed by the Fred Buggins Team at TooSoft...", and there are also those that gradually appear out of nothing, like this one...

```
10 CLS #
20 REM another go at fizzle
30 MODE 1: CLS
35 PRINT AT 0,0;"Please wait: data
   being set up"
40 gnum
45 PAPER 15: BORDER 15: PEN 10: CLS
50 FOR m=87 TO 1 STEP -1
60 LET n=RND(m-1)+1
70 PRINT AT 7+VAL (qq$(4*n-3 TO 4*n
   -2)),VAL (qq$(4*n-1 TO 4*n));""
```

```
 80 LET qq$=qq$( TO 4*n-4)+qq$(4*n+1
    TO )+qq$(4*n-3 TO 4*n)
 85 NEXT n
 87 PRINT #0; "Again?": GET p$
 88 IF p$="n" OR p$="N" THEN STOP
 90 IF done=1 THEN CLS : GOTO 50: EL
    SE RUN
100 STOP
140 DATA 00,01,02,03,06,07,10,11,12,
    13,15,19,22,23,26,27,28,29,30,99
150 DATA 00,05,08,10,13,15,16,18,19,
    21,24,28,99
160 DATA 00,05,08,10,13,15,17,19,21,
    24,28,99
170 DATA 00,01,02,05,08,10,11,12,15,
    19,21,22,23,24,28,99
180 DATA 00,05,08,10,11,15,19,21,24,
    28,99
190 DATA 00,05,08,10,12,15,19,21,24,
    28,99
200 DATA 00,06,07,10,13,15,19,21,24,
    28,999
210 STOP
220 DEF PROC sv: SAVE "fizzle" LINE
    20: END PROC
230 DEF PROC gnum
232 LET qq$=""
233 LET t=1
234 LET t$="01020304050607"
235 RESTORE 140
260 READ LINE a$
265 IF a$="999" THEN GOTO 300
266 IF a$="99" THEN LET t=t+2: GOTO
    280
270 LET qq$=qq$+t$(t TO t+1)+a$
280 GOTO 260
300 LET done=1: END PROC
```

Many thanks, Alan.

Now back to the Spectrum and the request in May's "Format" for Spirograph programs, which Barry Twyman of Herne, Kent, has just noticed. Just what he's got: had it since 1982. Here it is...

```
  5 LET LX=0: LET LY=0
  7 LET X=0: LET Y=0
 10 CLS
 20 INPUT "RADIUS OF OUTER RING?";R
 25 IF R=0 THEN GO TO 10
 30 INPUT "RADIUS OF WHEEL?";R1
 40 INPUT "POSITION OF WHEEL?";D
 50 INPUT "SPEED?";S
 55 LET LX=127: LET LY+87+R-D
 57 PLOT LX,LY
 60 LET A=0
100 LET X=(R-R1)*SIN (A)+(R1-D)*SIN (
    A *-(R/R1-1))+127
110 LET Y=(R-R1)*COS (A)+COS (A*-(R/R
    1 -1))*(R1-D)+87
120 DRAW X-LX, Y-LY
130 LET LX=X
140 LET LY=Y
150 LET A=A+S
160 IF INKEY$="" THEN GOTO 100
180 GOTO 20
```

Barry also mentions that he's got lots of other listings. Fine, except that I had to type this in, and this always leads to errors and takes a lot of time, and, incidentally, means I haven't tested this little prog. Perleaze, put 'em on tape or disc. And do send 'em along! Many thanks, Barry.

Those readers who are a little more astute might at this stage note a certain air of astringency, caused because a transformer (or something similar) on the north side of the Vale of Evesham went "Bang" and power ceased for two hours last night. And I'd saved nothing for more than an hour! I've often wondered what happens to all those words laboriously typed when they evaporate into the ether. Do they join the programs in the great sky which flew there during the infamous Rampack wobbles so beloved by ZX81 fans, I ask myself? Anyway, I lost an hour's typing, and I'm always short of hours. Worse was avoided, however. I run nearly all my stuff through a Bowman anti-surge plug: I learned the hard way when an enormous mains spike wiped the hard disc on my little Elonex laptop (hiss) at work, even though it was plugged into a supposedly filtered plug. Apparently (and I'm no great shakes at electronics; like I'm totally dumb) the thing works with a capacitor. This takes the top off your spike. However, if its capacity is exceeded, tough. It was! I therefore bought the superior sort, which leaks the spare juice to earth, and does all sorts of clever things I don't understand. Anyway, it saved the day. They're not outrageous (around twenty quid) and with the increase in thunderstorms and the ageing of my precious collection, I feel it's important. So that's why, on the London train today, I've got my "Short Spot" file, and I'm beating hell out of a Z88. Up till this year, I've always used this in one direction. I've written notes on it and piped them into a Spectrum +2, using the built-in RS232 port, and a little Basic program to read it and print the letters to an opentype file on disc. Slow, but then, it gives you time for coffee. I could then combine this text with stuff I'd typed on the Discovery-linked machine while testing programs and resaving them on the adjacent +2 with a PLUS D, or on SAM. But this year, with the decrease in reliability of some of my ageing gear (like the cassette interfaces are getting dodgy, and I relied on those to transfer my words to PLUS D at the end of the operation), I've had to change. So it now gets done in Windows (3.1, no less), and sent to Bob on a DOS disc. All his means that I've had to buy some stuff from Rakewell (bless 'em) for the Z88 - a PC link program and extra RAM. The PC link works splendidly, and I've no problem in sending stuff to and fro. This set me thinking. Christie, of Stonehouse, years ago, marketed a thing they called a "printdisc" - you piped your stuff into it, took it away, and plugged it into something somewhere else, and released the electronic valve holding all the bits and bytes. Magic! They all shot back again. Now couldn't I do the same with the Z88. No, this time this isn't an April fool! What I want to do is collect output from the RS232 printer port of the Spectrum, (or anything else). I have a little program from Bob which does just this for the BBC. Unfortunately, although the Z88 contains BBC Basic, it's a bowdlerised version. Like some of the commands opening files are missing. So it doesn't understand *FX7,7, or *FX2,1, and fails to do the business. My knowledge of BBC Basic was always elementary, dear Watson, and now I've forgotten it completely. No, I don't know what they mean either. Take Courage; I'm no worse than the Z88. I feel I'm re-inventing the wheel here: surely someone's done this already. Anyone out there help me???

Let's get back to the Spectrum now, courtesy of Eric Olyott of Portsmouth. He's sniffed out some elderly (and rather interesting) programs from a variety of sources, but principally from a magazine called "Input". Firstly, "Dottodot". This little program has also been called "Mastermind". Eric's instructions tell us that the idea is to figure out what the combination of hidden coloured pegs is. Eric says that a right peg in the right place results in a black peg; a coloured peg in the wrong place, but in the final result, results in a white peg. Gedditt? No? neither did I, though I guess you can figure it out from the program. Anyway, have a go. Here it is...

```
 10 POKE 23658,8: BORDER 0: PAPER 4:
    INK 7: CLS : LET N$="671254": DIM
    C(4): DIM G(4): DIM F(4,2): LET
    C$="YBRCM"
 15 GOSUB 270
 20 PRINT AT 16,0;"COLOURS:-"'"Y=YELL
    OW B=BLUE C=LIGHT BLUE   R=RED
    M=MAUVE W=WHITE"
 30 FOR N=USR "A" TO USR "A"+7: READ
    A: POKE N,A: NEXT N: DATA 0,24,60
    ,126,126,60,24,0
 40 FOR K=1 TO 4: LET C(K)=VAL N$(INT
    (RND*5)+1): NEXT K: LET G=1
 50 INPUT "WHAT'S YOUR GUESS ? ";B$
 60 IF LEN B$<>4 THEN GOTO 50
 70 PRINT AT G,0;"GUESS NO. ";G;AT G,
    14;: FOR K=1 TO 4: LET G(K)=(7*(B
    $(K)="W"))+(6*(B$(K)="Y"))+(B$(K)
    ="B")+(2*(B$(K)="R"))+(5*(B$(K)="
    C"))+(3*(B$(K)="M"))
 80 IF G(K)=0 THEN LET K=4: NEXT K: G
    OTO 50
 90 PRINT INK G(K); BRIGHT 1;CHRS 14
    4;: IF K<>4 THEN PRINT BRIGHT 1;
    " ";
100 NEXT K
110 PRINT AT G,24
120 LET N=0: LET R$=" ": FOR K=1 TO 4
    : LET F(K,1)=0: LET F(K,2)=0: IF
    G(K)=C(K) THEN LET R$=R$+" "+CHRS
    16+CHRS 0+CHRS 144: LET F(K,1)=1
    : LET F(K,2)=1: LET N=N+1
130 NEXT K
140 FOR K=1 TO 4: IF F(K,1)=1 THEN GO
    TO 140
150 FOR J=1 TO 4: IF F(J,2)=1 THEN GO
    TO 170
160 IF C(J)=G(K) THEN LET R$=R$+" "+C
```

```
HR$ 16+CHR$ 7+CHR$ 144: LET F(J,2
)=1: LET J=4
170 NEXT J
180 NEXT K
190 LET D$="

200 PRINT AT G,23;R$: INK O: IF N=4 T
HEN PRINT AT 16,0;D$;AT 17,0;D$;A
T 18,0;D$;AT 16,0;"YOU GOT THE CO
RRECT CODE IN ";G" GUESSES ": GOT
O 230
210 LET G=G+1: IF G<13 THEN GOTO 50
220 PRINT AT 16,0;D$;AT 17,0;D$;AT 18
,0;D$;AT 16,0;"THE CORRECT CODE W
AS ";: FOR K=1 TO 4: PRINT INK C
(K);CHR$ 144;" ";: NEXT K
230 PRINT ""TRY AGAIN 7"
240 LET A$=INKEY$: IF A$="" THEN GOTO
240
250 IF A$="Y" THEN RUN
252 IF A$="N" THEN GOTO 260
254 IF A$<>"Y" OR A$<>"N" THEN THEN GOTO 2
40
260 STOP
270 PLOT 102,175: DRAW 75,0: DRAW 0,-
108: DRAW -75,0: DRAW 0,108
400 RETURN
```

Many thanks to all who send programs. Without them, we'd have no column. Each month I try and select a balanced selection, so if yours hasn't come up yet, it's probably queueing in my file. Please keep them coming to John Wase, Green Leys Cottage, Bishampton, Pershore, Worcs, WR10 2LX. See you!

"It was the party-political broadcast last night..."

SC-DTP for SAM

Reviewed By:- Carol Brooksbank.

The program is designed to be mouse-operated, but if you have no mouse you load a file from the master disc, put your backup in the drive, and its files are modified for keyboard control.

In a world where many publishers seem hell-bent on preventing users from making a working copy of the master disc, it is refreshing to find a program which not only gives clear instructions for making a backup copy, but includes in the package a printed label to put on your working disc. A nice touch I have not met before.

The main menu screen displays a small-size reproduction of your whole page layout on the left, and the menu

options on the right. (Fig.1) Illustrations - clip art or other graphics - may be grabbed from pre-prepared screens, the cursor moved on the page display to the top left corner of the graphic's position, and pressing the mouse select button (or the select key) will insert the illustration into the page. Illustrations will be in only one size. If you want to rescale them you must do it with the art package before grabbing the artwork into this program. Any Sam screen (in any mode) or a Spectrum screen file, may be used as a source for graphics so all the Spectrum and Sam clip art on the market can be used with the program. The publisher promises an upgrade (free to current purchasers) later in

```
H or Mouse right enlarge area
Grab a screen from Disc/Memory
Reverse alter colours
CLS area

Word Processor
Text print TAB Justify/Margin
              EDIT Alter Tokens
Print Word Proc text

Dump DTP
sDump Alter

Load DTP Filer
sLoad WP file

SSave DTP file
sESave WP file
```

Fig.1 - The Main Screen

the year, which will include its own clip art selection.

Text is entered via the program's own built in word processor, which will also accept Secretary, Spellmaster or Outwrite files. When you enter text, control codes can be entered to select the fonts which come with the program. Alternatively, if you want to use the program as a normal word processor, you can load from the disc an alternative code block which enables you to enter normal printer control codes - bold, italic, etc.

The program comes with two main print faces - Times and Helventi. These are available in various sizes between 12pt and 24pt, each size in normal, bold, normal italic, bold italic. In addition there are 16 8x8 matrix fonts - like normal Spectrum/Sam screen fonts.

The word processor is simple, but quite usable. It lacks many of the sophisticated features available on other Sam word processors, but it has good cursor movement, a find word option, and can copy or delete blocks. Its maximum capacity is only 24576 bytes, which could be rather limiting.

When you have entered the text for your page - the program only handles one page at a time - you exit the wordprocessor and return to the main menu, where you can define up to 6 boxes, into which the text will be placed, flowing from box to box in the order in which you defined them until all the text has been placed. If your boxes are not big enough to display all your text in the type sizes you have chosen, the text will be truncated.

It is quite difficult to place text and illustrations precisely. There is no grid, and no display of co-ordinates, to help you while you are defining boxes. If you get it wrong you cannot just move one box a pixel or two and try again. The text is always put on screen from the start of the textfile, so if you have used 6

boxes, and number 4 is out of place, you have either to re-do all the text placement, or delete all the text from the word-processor which went into boxes 1-3 so that you get the right bit starting in box 4. If you don't do that, but simply put a new box in box 4's position, you will find that the start of the textfile has been put in the new box.

If you change a box, you are faced with two choices. You can either clear the screen in the area you wish to change, in which case you cannot refer back to where it was to help you relocate it. Or, you can leave the original text in place and draw the new box. Then, all the text within the new box will have replaced the old, but if you had moved it by a pixel or two, there will be leftovers of the original text which you have to wipe out pixel by pixel using the program's enlarged option.

The enlarged option lets you draw directly into your page. As screen mode 3 is used, only four colours are available. Cursor co-ordinates are displayed, but they always refer only to the current window onto the page, not to the page as a whole. So if the cursor is at the left of the screen, the x co-ordinate will still be 0, even if the portion displayed is over on the right of the page.

Only one drawing tool is available - line drawing - in addition to changing individual pixels. There is a small super-enlarged window which displays the pixels around the cursor for detailed work.

Whether you are satisfied with the print quality will depend very much on your printer. If you have a 24-pin printer, especially if it is a bubble-jet, the quality is very good. The 4 colours are shaded, and the print is nice and crisp. But the page is A5 size. You can see the program's output in the full-page advert for the program which Steve's Software has been running in Format. With a 9-pin dot matrix printer, graphics printing is fine, but text quality is quite

poor, though at least the page is A4. A single pass per line printout gives a very "dotty" appearance and a grey-looking page. You can specify how many passes the head is to make, and I find that with a reasonable ribbon 3 passes is about right. It gives a good dense black and is fine with illustrations and large print, but smaller fonts can look a bit blurred, with the spaces in letters like "a" and "e" being almost closed up.

An enlarged printout is available to 9-pin users, in which colour shading, not available in normal A4 size, is implemented.

The page is retained in memory as 8 mode 3 screens, and when you save a page to disc, that is what is saved, plus an introductory file. If you save the wordpro file too, that also takes up as much room as a mode 3 screen. The consequence of all this is that only 3 pages can be saved to a disc, and the program cannot be used with a 256K Sam.

I have to say that the program is rather disappointing. I had hoped that we should have a flexible program, capable of holding several pages in memory at once, with versatile hi-res fonts - something approaching the sort of thing you get in a PC DTP program. What we have is not really a DTP program at all in the strict sense of the word, but a pagemaker, whose output is one large screendump. The quality of screendumped text can never be as good as that of hi-res fonts like those used by PCG/ Polytype's DTP, or by Qualitas with Tasword. The illustration reproduction in this program is fine, but a DTP program stands or falls by its text handling.

It is extraordinary that the program can handle only one page at a time with 512K of memory available, and that the 256K machine cannot cope with it at all. The author has backed himself into a corner by opting to use one huge screen built up of 8 mode 3 screens, and hold them all in memory at once. It all reminds me rather of the Pagemaker in the Artist 2 program

on the Spectrum. Its output quality is a little better than that because it can do multiple passes and multiple copies, but its text quality is simply not in the same league as PCG's program.

Still, enhancements and extra fonts and clipart are promised for the future, so it may be that this early version will soon be much improved. Meantime, if you want to produce A5 work, and have a 24-pin printer you will probably be happy with it now, but for those who have a 9-pin printer or who need to work in A4, I am afraid that you will not think that SC DTP gives you what you are looking for yet.

PROBLEM SOLVING
WITH YOUR COMPUTER

By:- Don Thomasson.

Part 5 of our series for the confirmed puzzler shows how to sort items into sets, and poses a magic square problem for you to solve.

Last month, you were invited to work out a program to solve logic problems involving the arrangement of items into sets. There is a method for doing this by hand which is the basis of the program. It involves a special kind of table.

The form of table for three sets of three items is shown in Fig.1. A '1' indicates a positive link, a '0' indicates that a link is barred. Two positive links have been inserted, for A1/B2 and A2/C3. These automatically bar A1/B1, A1/B2, A2/B3, and so on. Only one '1' can occur in a line within a box. The other entries on that line must be '0'.

In addition, B2/C3 is barred, because the entries in the A2 line must match those in the C3 line. If there were two '0' entries in a line within a box, the third entry must be 1.

Fig.1 Truth Matrix - 3 sets of 3

The program in Listing 1 expands this scheme to the four sets of six items quoted in the set problem. The fact that it is written in modular form was a matter of convenience, not a concession to academic views!

Let's walk through the program and see what it does.

The subroutine at line 2500 clears the main working array from which the display is refreshed. Subroutine 3000 then allows the item names to be set up, displayed, and corrected if necessary. In the given puzzle, the house numbers should be put into the last set, as there is no room to show them in the display.

Line 1000 then invites input of linkage data. Three operators are used:-

* A1=B1 will link items A1 and B1 as being in the same set.

* A1<>B1 will state that the items are in different sets.

* A1#B1 will clear an entry (but not its consequences).

Subroutine 1200 analyses the input line into two names and an operator. The operator determines the value of OP, and the names are converted into pointers to the main array, R1 and R2.

Subroutine 1400 then comes into play. R1, which sets the 'line' of the array, must be less than R2, which sets the column. The two pointers are exchanged, if necessary, to achieve this. Then, for OP=0 a full stop is set in the display and 1 is set in the main array, using subroutine 1600. For OP=2, '0' is set in the display and 5 in the array. All new entries are 'bright' to make them stand out.

For the above actions, no consequent action is taken. It would be possible to search for '1' entries in the R1 and R2 lines, and enter the 'reflections' of the single entries, but that is not strictly essential, especially if barred entries are made first. If an error is made, however, it may be best to input 'WIPE', which clears the main array, and start again.

For OP=1, the action is more complex. If there is already an '0' entry at the chosen point, 'ERROR' is reported, and the routine drops out. Otherwise, subroutine 1700 is called to set up the six directly barred entries in line with the '1' sign. The entries in the lines defined by R1 and R2 are compared. If they are the same, no action is necessary. If either is '.', it is set to match the other. If one is '1' and the other '0', ERROR is reported.

Because any new '*' entry may have far-reaching consequences, its co-ordinates are stacked in array D to make sure no entry gets lost, but that becomes more significant in the final stage.

When an entry has been completed, the subroutine at line 2000 refreshes the display, removing the bright entries.

The final function is called by an input of SCAN, which invokes subroutine 2200. This may be called at any time but its performance is shown to best advantage if all the given data is input first. You can then sit back and watch the fun.

SCAN locates any lines of the .000 form, where the blank entry must be '1'. Once this process starts, it should go on step by step until the diagram is complete, with all the relationships defined. If it stops short, some essential item of information is missing, and this is very useful in compiling puzzles of this type.

The program has been described as briefly as possible in order to leave room for the listing and the problem for next month.

Listing 1.

```
100 DIM A$(6,4,8): DIM P$(20): DIM Q$
    (20): DIM C(24,24): DIM (60,2)
110 GOSUB 2500: REM ** CLEAR ARRAY
120 GOSUB 3000: REM ** INPUT NAMES
130 CLS
140 GOSUB 2000: REM ** PUT UP DISPLAY
150 GOSUB 1000: REM ** INPUT LINKAGE
    DATA
160 GOSUB 1400: REM ** MODIFY DATA
170 GOTO 140
1000 INPUT "DATA ? ";P$
1010 PRINT AT 20,0;"(10 SPC)"
1020 IF P$(1 TO 4)="WIPE" THEN GOSUB 2
     500: GOSUB 2000: GOTO 1000
1030 IF P$(1 TO 4)="SCAN" THEN GOSUB 2
     200: GOSUB 2000: GOTO 1000
1040 LET K=1: LET L=1: LET Q$="": LET
     A=0: LET B=0
1050 GOSUB 1200]
1060 IF A*B=0 THEN PRINT AT 20,0; "NOT
     FOUND": GOTO 1000
1070 LET R1=4*(A-1)+B: LET L=1: LET A=
     0: LET B=0: LET Q$=""
1080 GOSUB 1200
1090 IF A*B=0 THEN PRINT AT 20,0;"NOT
     FOUND": GOTO 1000
1100 LET R2=4*(A-1)+B
1110 RETURN
1200 IF P$(K)="(SPC)" THEN GOTO 1260
1210 IF P$(K)="#" THEN LET OP=0: GOTO
     1290
1220 IF P$(K)="=" THEN LET OP=1: GOTO
     1290
1230 IF P$(K)="<>" THEN LET OP=2: GOTO
     1290
1240 LET Q$(L)==P$(K)
1250 LET L=L+1
1260 LET K=K+1
1270 IF K>20 THEN GOTO 1300
1280 GOTO 1200
1290 LET K=K+1
1300 FOR T=1 TO 6: FOR N=1 TO 4
1310 IF Q$(1 TO 8)=A$(T,N,1 TO 8) THEN
     LET A=T: LET B=N
1320 NEXT N: NEXT T
1330 RETURN
1400 LET ERROR=0: LET F=0
1410 IF R1>R2 THEN LET R3=R1: LET R1=R
     2: LET R2=R3
1420 IF OP=0 THEN LET M=1: LET A=R1: L
     ET B=R2: GOTO 1600
1430 IF OP=2 THEN LET M=5: LET A=R1: L
```

```
ET B=R2: GOTO 1600
1440 IF C(R1,R2)=5 THEN LET ERROR=1: G
     OTO 1460
1450 GOSUB 1700
1460 IF ERROR=1 THEN PRINT AT 20,0;"ER
     ROR": RETURN
1470 LET A=R1: LET B=R2:LET M=20: GOSU
     B 1600
1480 IF F=0 THEN RETURN
1490 LET R1=D(F,1): LET R2=D(F,2): LET
     F=F 1
1500 IF R1>R2 THEN LET R3=R1: LET R1=R
     2: LET R2=R3
1510 GOTO 1440
1600 LET C(A,B)=M
1610 IF M=1 THEN LET E$="."
1620 IF M=5 THEN LET E$="0"
1630 IF M=20 THEN LET E$="1"
1640 LET P=7: LET U=INT ((A-1)/4): IF
     U=1 OR U=3 THEN LET P=5
1650 PRINT BRIGHT 1;PAPER P;AT A,B+INT
     ((B-1)/4+1);E$
1660 RETURN
1700 LET S=4*INT ((R1-1)/4)
1710 FOR X=S+1 TO S+4
1720 IF X=R1 THEN GOTO 1740
1730 LET A=X: LET B=R2: LET M=4: GOSUB
     1600
1740 NEXT X
1750 LET S=4*INT (R2-1)/4)
1760 FOR X=S+1 TO S+4
1770 IF X=R2 THEN GOTO 1790
1780 LET A=R1: LET B=X: LET M=5: GOSUB
     1600
1790 NEXT X
1800 LET BR1=4*INT ((R1-1)/4): LET BR2
     =BR1+5
1810 LET BR3=4*INT ((R2-1)/4): LET BR4
     =BR3+5
1820 LET H2=R1: LET H4=R2
1830 IF BR1<4 THEN GOTO 1850
1840 FOR X=1 TO BR1: LET H1=X: LET H3=
     X: GOSUB 1900: NEXT X
1850 LET H1=R1: IF BR3<BR2 THEN GOTO 1
     870
1860 FOR X=BR2 TO BR3: LET H2=X: LET H
     3=X: GOSUB 1900: NEXT X
1870 LET H3=R2: IF BR4>21 THEN GOTO 18
     90
1880 FOR X=BR4 TO 24: LET H2=X: LET H4
     =X: GOSUB 1990: NEXT X
1890 RETURN
1900 IF C(H1,H2)=C(H3,H4) OR ERROR=1 T
     HEN RETURN
1910 IF C(H1,H2)+C(H3,H4)=25 THEN LET
     ERROR=1: RETURN
1920 IF C(H1,H2)=1 AND C(H3,H4)=5 THEN
     LET A=H1: LET B=H2: LET M=5: GOT
```

```
0 1600
1930 IF C(H1,H2)=5 AND C(H3,H4)=1 THEN
     LET A=H3: LET B=H4: LET M=5: GOT
     0 1600
1940 IF C(H1,H2)=1 AND C(H3,H4)=20 THE
     N LET A=H1: LET b=H2: GOTO 1970
1950 IF C(H1,H2)=20 AND C(H3,H4)=1 THE
     N LET A=H3: LET B=H4: GOTO 1970
1960 RETURN
1970 LET F=F+1: LET D(F,1)=A: LET D(F,
     2)=B: RETURN
2000 FOR T=1 TO 5
2010 IF T=2 OR T=4 THEN PAPER 5
2020 IF T=3 OR T=5 THEN PAPER 7
2030 FOR N=1 TO 4
2040 LET TAB=5*(T-1)
2050 LET LINE=4*(T-1)+N
2060 PRINT AT LINE,TAB;A$(T,N,1 TO 7);
2070 FOR X=0 TO 5-T
2080 FOR Y=1 TO 4
2090 LET G=C(LINE,4*(X+T)+Y)
2100 IF G=1 THEN PRINT ".";
2110 IF G=5 THEN PRINT "0";
2120 IF G=20 THEN PRINT "1";
2130 NEXT Y
2140 PRINT "[SPC]"
2150 NEXT X
2160 NEXT N
2170 NEXT T
2180 RETURN
2200 LET FH=0. FOR A=0 TO 5: FOR B=A T
     0 5
2210 LET S1=4*A: LET S2=4*B
2220 FOR C=1 TO 4
2230 LET J=0: LET K=0
2240 FOR D=1 TO 4
2250 LET J=J+C(S1+C,S2+D)
2260 LET K=K+C(S1+D,S2+C)
2270 IF J<>16 THEN GOTO 2320
2280 FOR E=1 TO 4
2290 IF C(S1+C,S2+E)=1 THEN LET F=F+1:
     LET D(F,1)=S1+C: LET D(F,2)=S2+E
2300 LET FH=1: GOSUB 1470
2310 NEXT E
2320 IF K<>16 THEN GOTO 2370
2330 FOR E=1 TO 4
2340 IF C(S1+E,S2+C)+1 THEN LET F=F+1:
     LET D(F,1)=S1+E: LET D(F,2)=S2+C
2350 LET FH=1: GOSUB 1490
2360 NEXT E
2370 NEXT D
2380 NEXT C
2390 NEXT B
2400 NEXT A
2410 IF FH=1 AND ERROR=0 THEN GOTO 220
     0
2420 RETURN
2500 FOR X=1 TO 24: FOR Y=1 TO 24
```

```
2510 LET C(X,Y)=1
2520 NEXT Y: NEXT X
2530 RETURN
3000 CLS
3010 FOR T=1 TO 6: FOR N=1 TO 4
3020 PRINT AT 0,0;"SET ";T;"NAME ";N
3030 INPUT "NAME ? ";A$(T,N)
3040 NEXT N: NEXT T
3050 PRINT AT 0,0;"INPUT COMPLETE"
3060 FOR T=1 TO 6: FOR N=1 TO 4
3070 PRINT AT 2*T,8*(N-1);A$(T,N)
3080 NEXT N: NEXT T
3090 INPUT "ANY CORRECTIONS ? ";N$
3100 IF N$="N" OR N$="n" THEN RETURN
3110 INPUT "TYPE ? ";T
3120 INPUT "NUMBER ? ";N
3130 INPUT "NAME ? ";A$(T,N)
3140 GOTO 3060
```
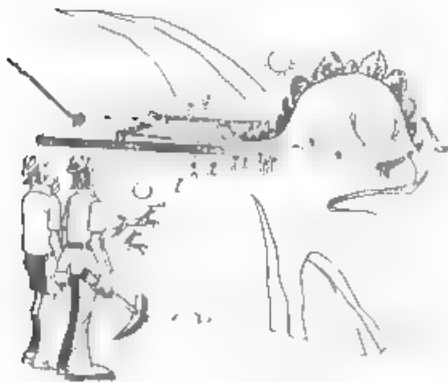
And now a problem to keep you thinking until next month. You are invited to teach your computer to work out magic squares for which partial data is given, as follows:-

x	x	x	12
8	x	2	x
x	x	15	x
x	3	x	5

Each row, column and main diagonal must add up to 34, and the final diagram should contain the numbers 1 to 16.

See you.

"It seems that the mouse-trap is older than we thought."

CAMPION - THE SPREADSHEET
For Spectrum and Sam

Reviewd By:- Ken Elston.

Spreadsheet programs are one of the mainstays of the software market on IBM PCs and their like. Lotus 1-2-3, Exel, Quattro Pro and others can be found in almost every office.

The Spectrum has had a few small programs around for some time but none have come anywhere near the programs available on bigger machines. Tascalc was probably the best, although that needed a 128K Spectrum and was quite slow when you started dealing with any reasonable sized sheet.

SAM has had one offering, GM Calc. This was written in basic and was quite a simple program. While usable for very small spreadsheets it was too slow really for it to make the grade as a commercial program.

Well, now both SAM and Spectrum owners can equip themselves with a really powerful spreadsheet program, called CAMPION, which has just become available from Revelation Software - renound in the SAM world for their wordprocessor 'The Secretary'.

The program is essentially the same on both machines, the only real difference being the total memory available., The Spectrum can store around 25,000 bytes - more than enough for most applications, while the SAM version sets aside 64K for your work - a really vast amount. SAM can read Spectrum disc files but not the other way round. This makes for easy upgrade when you come to buy that SAM you've been promising yourself as Revelation will upgrade you to the SAM version at a very reasonable cost.

Campion is available for the Sam Coupé or for a Spectrum fitted with either DISCiPLE or PLUS D disc systems. You need to state SAM or Speccy on your order. Revelation are

hinting that Discovery, +3 disc and even a tape version will be out later in the year.

Priced at £29 95 (£5 off for INDUG members) it is not a cheap program. But when you compare its features to PC spreadsheets and then compare prices I think you will find CAMPION to be value for money.

As you will appreciate, a program as powerful as CAMPION takes much reviewing. It is easier to compare it to a programming language than to most other types of programs. Spreadsheets do a job. That job can be almost anything you want it to be - provided you can set up a sheet to do what you want. Because of this complexity I am only going to scratch the surface in this 'FIRST LOOK'. I will leave it to others to write in with their experiences.

OK. So what is a spreadsheet? Well imagine a sheet of paper divided into columns. Let's say we look at income over three months.

SOURCE	JAN.	FEB.	MAR.	TOTAL
Job 1	1200	1200	1200	3600
Writing	100	100	35	235
Singing	5	25	0	30
Totals	1305	1325	1235	3865

Well, its simple, and you can tell I won't get very fat singing for my supper. However it will help to illustrate my points.

If this data was set up as a spreadsheet each column would have an identification letter A,B,C etc. While each horizontal row would be numbered 1,2,3,4 etc.

CAMPION can have column idents A-Z,

AA-AZ, BA-Bz, CA-CZ and DA-DX. That's 128 colums in all. Row numbers go from zero to 999. Spreadsheets work on CELLS. Cell D6 would be located in the fourth column, seventh line.

So if we identify our colums as A,B, C,D and E and our rows as 0 to 6 we can make a start. Rows 0 and 1 are just text, there is no data at all. Column A is also all text. The real data being contained in cells B2/3/4, C2/3/4 and D2/3/4. The others are totals - something we can make the spreadsheet produce for us. Cell E2 needs to contain the result of adding my income from Job 1.

Well spreadsheets make this easy. Each cell can hold data of course, but they can also hold formula. Now formula can be very simple (which is all we need here) or very complex. You will find that CAMPION is wonderful to use as it often gives you short-cuts to the more complex formula you may require. In fact the manual is excellent in this respect, listing all the simple functions that save you typing complex items.

Back with our sample, Cell E2 would contain the formula B2+C2+D2. This tells the program to add up the contents of these three cells and put the result in E2. Simple. E3 would contain the same formula but with the row numbers changed to 3.

Having added up the rows you will see that adding up the colums is just as easy. Cell B6 would need to contain the fomula B2+B3+B4. And so on for each column. The grand total, in cell E6, could be calculated by adding all the data cells together or by adding all the calculated row totals or by adding all the column totals - either would be valid.

Now I know many of you are thinking "I could do that quicker with pencil and paper." So could I. But spreadsheets have the advantage that, once the fomula are in place, you can just throw new data at them and they do their job again (and again, and again).

OK, so that is a VERY SIMPLE spreadsheet. CAMPION goes much further. It contains over seventy built-in functions which take the strain out of writing formula, here are a list of some of them:- ABS; ACOS; AND; ASIN; ATAN; ATAN2; AVG, BIN; CELSIUS; CHOOSE; COM; COS; COUNT, COUNTA; DDB; DEGREES; DIV; EXP; FAC; FAHRENHEIT; FALSE; FRAC; FV; FVAL; GRATIO; HEX; HLOOKUP; IF; INT; IRATE; LN; LOG; MAX; MEDIAN; MIN; MOD; NEG; NOT; NPER; NPV; OR; PER; PI; PMT; POS; PRODUCT; PV; PVAL; RADIANS; RANGE; RATE; RND; RND(; ROOT; ROUND; SGN, SIN; SLN; SQR; STD; STDS; SUM SYD, TABLE; TAN; TERM; TRUE; TRUNC; VAR; VARS; VERSION, VLOOKUP.

The program allows relative as well as absolute referencing to cells and it is intelligent enough to cope with formula that refer to cells that are not yet updated.

CAMPION also allows a cell to be filled based on a reply to a question, allowing you to select information from large tables and display it in a readable form.

The manual, over 90 pages, takes you step-by-step through the program. It is very well written, better than many I've seen on the PC. Each feature and function is explained in full, often with good examples. It is fully typeset so it is clear and readable and it assumes no knowledge of, or previous experience with, spreadsheets.

For your money you get a program that is a match for anything I've seen on other machines. Being fully machine code the program is fast, even on the 48K Spectrum - on SAM its very fast. The manual is the best I've ever seen on any Spectrum or SAM product. This program is a must for all. I'm confident everyone will find a use for it.

Finally, I must say it is very good to see a new Spectrum program being launched - there are far to few these days. Well done Revelation - keep up the good work.

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YOUR LETTERS

Dear Editor,
I'm sorry to say that I will not be renewing my subscription for FORMAT this year. Sadly I have replaced my trusty Spectrum with a PC, and have joined their support group. It isn't as good as FORMAT, infact, FORMAT rates as the Rolls Royce in comparing the two against quality, content and readability.
Thank you for your service over the years, maybe sometime in years to come FORMAT will include the PC.

Yours sincerely, T.M.John.

Don't forget to buy the Spectrum Emulator from B.G.Services. No PC is complete without it.
A PC version of Format? Now that's an idea... (if only I could find the writers that is) Ed.

- - - - -

Dear Editor,
As you will note above, I used to subscribe to FORMAT as a SAM user. I stopped subscribing at the end of 1991 as I had to pack away my SAM whilst working overseas. I am now back in the UK but I am disappointed to find absolutely nothing of SAM in any press or magazines! Has it died a death?
I really am considering selling my SAM because of the apparent lack of support but wonder if there is a market. Do you still have your 'Small Ads' section in the FORMAT magazine?
Could I possibly ask you to forward a copy of your latest FORMAT mag so I can see where we are up to.

Yours sincerely, J.Tarr.

Well if you haven't seen any issues of FORMAT since 1991 you sure have missed a lot of SAM news. Lack of support - nothing could be further from the truth. Keep your SAM, it is the most usable and affordable machine on the market. Ed.

Dear Editor,
I am writing to say that I would very much like to attend your proposed Gloucester show. Please put me down on your list. Sounds like a great idea!
I would also like to say how I like the little cartoons. And the covers too.... but who is "Jon"?

Yours sincerely, John Marshall.

For an autobiographical look at Jon Nixon you need to read Vol 6 No 1. Ed.

- - - - -

Dear Editor,
Thank you for your kind letter inviting me to rejoin Indug for a further session.
I deliberately hesitated for a while as my interest in SAM has suffered due to a number of problems I have been unable to resolve.
I have two machines in my household, one is largely used for writing letters as a word processor and the other my son plays games on.
The SAM is in many ways an excellent machine and I would not have chosen anything else short of a PC. I like the way it is so easy to program and its Spectrum compatibility.
Help has always seemed like a thousand miles away. The unfortunate companies who have tried to support and market this machine have not been able to give the same good treatment to their existing customers as they do to their new ones. It is sad that the 256K upgrade is being sold at a profit. I have a Spectrum messenger which I have never been able to make work, it is still without a case on it and I have a worthless letter promising that the case will be sent to me 'in due course'.
Occasionally items in FORMAT help with odd problems but most Help Pages are too advanced for my understanding and certain specific terms are used which I do not know the meaning of.

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Perhaps if you produced a glossary of terms it might make reading for some of us a little more intelligible.

I do believe, despite hard times that you are doing your best and I have decided to support you for another session. I would be pleased to receive the copies I have missed

However, a reply to this letter would be much appreciated.

Yours sincerely, Adrian P.Platt.

Help should never seem like a thousand miles away Adrian - just a phone call. It is always difficult to explain a term every time it appears in print, there just isn't enough room in FORMAT. But if you are ever stuck we are always pleased to explain things in more detail if you give us a ring on the hotline number - that is what we are here for.

Obviously the 256K has to be sold at a profit (low though it may be) otherwise there would be no money to develop new products. As to your statement 'good treatment' I can't understand what you are on about - every company I know in the SAM world treats all customers equally. Perhaps you would like to expand on your comments in another letter. Ed.

- - -

Dear Editor,

Thank you for your letter regarding the fact that I was once a member of this group and for reminding me of the fact that I could re-join.

I was a member from day one and still have all my copies but over a period of time it seems to have been forgotten that INDUG stood for INDEPENDENT DISCIPLE USER GROUP with articles concentrated on the PLUS D interface and then on the SAM Coupe and in reality promoting the interests of Miles Gordon Technology.

Technology must not stand still and this change of emphasis would not have been so bad had not first MGT gone into liquidation and then its successor company Samco. Individuals cannot afford to invest in a technology which has not the security of an organization which can continue to support it and companies which are liquidated are not in that category.

I have great admiration for the pioneering work of both Bruce Gordon and Alan Miles but have reluctantly decided that I must move to an MSDOS standard for my machine if I am to continue to work efficiently. I cannot therefore consider rejoining.

Yours sincerely, F.H.Perrin.

Yes, I agree INDUG did originally stand for the INdependent Disciple Users Group but that was way back in 1987. When the PLUS D arrived we logically expanded to cover the DISCiPLE's baby brother, after all they are almost totally compatible as far as software is concerned. Very few articles that mention the PLUS D do not apply equally to the DISCiPLE.

Then, as time passed, we covered more varied items of a more general Spectrum nature. After all you buy a disc interface to help you get more from your computer - everyone with a DISCiPLE or PLUS D has to have a Spectrum or they would not be able to use them would they.

The next step was to expand to cover SAM. Two reasons. First it was by the same designer as both the previous products we had supported. And second, it is the best Spectrum never designed by Sinclair Research.

I feel we have now reached the stage where the majority of articles each year apply just as well to both Spectrum and SAM. INDUG could now be said to stand for 'The Independent Disciple, Plus D, Spectrum and Sam and Z80 User Group'.

As for moving to MSDOS, I could fill FORMAT with a list of companies selling PCs that have gone bust in the last year - at least SAM (and the DISCiPLE/PLUS D) still has a lot of 'affordable' support. Ed.

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Dear Editor,

As an older subscriber to FORMAT I was very pleased to read the article by John Redfern about about Printer Control Codes as it answered the questions I had been struggling with for some time.

I had tried for the best part of a year to get my Citizen 120D+ to work from basic but did not know the

correct way to set up the Printer Interface until the April edition of FORMAT. Now my SAM can communicate quite happily in different fonts etc.

As stated earlier I can only use my 44 years of age as an excuse for not being more "computerate".

Thanks John Redfern and thanks FORMAT, keep up the great work.

Yours sincerely, R.Chowdhury.

Older! I have to inform you that you are a positive youngster compared to some of our readers - several in the seventies and eighties. (and speaking as someone with less that 12 months to go to my 40th, I think 44 is an OK age to be - it had better be anyway - I'm nearly there. Ed.

. . . . .

Dear Editor,

Well, I must say that I'm glad I finally got round to subscribing to FORMAT and I wish I'd done it earlier. It's a most informative read, although I must admit that some bits aren't quite for me (at the moment). I have very much enjoyed the first couple of issues I received. There were no problems with getting my second issue late (one month) - I completely forgot about it until both issues arrived at once! (shows how much attention I'm paying doesn't it!) (get to the point boy!).

Oh yeah! Sorry. The reason I'm writing really is to say that I think the idea of having a computer-type gathering in Gloucester is great - partly because I live right near Gloucester myself, but also because it might revive interests in the area. I can say that I, and maybe another member of my family, would certainly like to go along.

If this gets printed (unlikely) in the June issue (very unlikely), I'd like to wish everyone taking exams, like me, very good luck. Also, could someone do a review of CAMPION - The Spreadsheet. Please find enclosed with the disc of the printed letter, I am presuming that the section 'Writing for FORMAT' applied to all writers-in.

Secretary problem number X: when I enter the date and time myself (I haven't got the SAMbus) before loading

The Secretary I can't get it put on the screen by selection, it either puts a "?" or arbitrary numbers. Anyone know why? Can't say I'm too bothered either way - it takes about the same time to select it as it does to type it in anyway.

Well that's about all, except to say I'm looking forward to the next issue.

Yours sincerely, Paul Bloomer.

P.S.You never know, you might get to like the idea of musical computers some day.

P.P.S.I've just thought of this poem.-
There is a computer called SAM,
Who thinks he s a bit of a man,
He annoys all his users,
When he just refuses,
To work when they know that he can!

I'd just like to point out that this shows no reflections on my own (and hopefully everyone elses) views. (well maybe occasionally).

REPLY Thanks for putting your letter on disc - as it was reasonably short we would have typed it in anyway but it is the thought that counts.

I'm not sure what your problem is with The Secretary, I don't really understand your question - send a few more details to Ray on the Help Page.

And as to the poetry - if SAM was a man there would never be a problem. I reckon SAM is female. Ed.

- - -

Dear Editor,

You asked for comments from old S&SC subscribers. I have two comments:-

First of all you went a little over the top with Malcom Perry. Not that you weren't justified but I would suggest that in future you ignore all of his letters. He obviously hasn't the courage to speak to you and if you ignore him he might just go away and leave FORMAT to carry on providing a service which is infinitely more reliable than S&SC.

My other point is rather more serious - a lot of subscribers to S&SC did in fact mainly only buy one copy, and those of us who were regular subscribers were reaching the limit of

our patience because Garner Designs had lost interest in +3 Users which was the Club that they initially formed.

I know that the plus three was hardly catered for by the Software houses, and I know that not a lot of hardware had been produced, BUT there were a number of enthusiasts who produced listings and hardware adaptations which they sent both to FORMAT and to Garner Designs so that the back issues contain a lot of articles of interest to Spectrum owners.

Many of the current +3 owners weren't around when some of these listings were first issued and have no idea which editions the interesting articles are in...

For instance in the last issue of the HELP PAGE there was a comment that a couple of readers wanted to expand the Basic part of Tasword Two. Kevin commented that he "suggested buying back issues". Not a word though about which back issues contained the relevant information.

It is possible that some readers will buy the back issues but I think it more likely that they will not renew their subscription to FORMAT.

You don't receive a lot of text about the +3 and I would suggest that you reprint some of the old material (even a lot of 48K and 128K material can be used on the +3).

This would keep the +3 owners interested and if you quoted the editions which the information originated from then you might have people buying these back copies in the hope of unearthing more interesting items.

I have been forced to start buying YOUR SINCLAIR not because I have any interest in the games content but because it is the only publication which gives me up to date advertisements from the larger dealers.

Yours sincerely, G.E.Fowles.

And that was positively the last word on the Mr Perry saga - I hope. At the moment I have to admit that there is not enough +3 material around

and we would be interested in republishing anything we can get our hands on. Yes 48K and normal 128K programs will almost certainly work on the +3 but there are machine specific areas that need to be covered.

As part of the takeover of S&SC Daniel Garner was supposed to write a regular column for FORMAT on the +3. It is as late arriving as S&SC usually was.

A complete set of back-issues are still available and many new members acquire them either straight away or at least gradually over their first year. They are a good investment. Ed.

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Dear Editor,

For some time I have been puzzled by readers talking about their memory upgrades. I seem to have missed out on this offer is it still going? How can I avail myself of it? (I can find no leaflet in the October issue).

On a different tack, regarding the point command in SAM Basic. If you run this little prog:-

```
10 FOR A = 1 TO 16
20 PLOT PEN A-1; A-1,173
30 NEXT A
40 FOR B = 1 TO 16
50 PRINT POINT (B-1, 173)
60 NEXT B
```

The result is not at all what you expect. The first 8 pens are incorrect! Is this a well known bug in ROM 2? Is it corrected in ROM 3? Is there any way round it?

It occurs to me it would be useful to know what other bugs readers have found or that you and Andy Wright know about. Could you print a list?

Is there a ROM 4? How does one go about purchasing a new ROM if its available? To get back to the point command. Delving into the manual I came across mention of the colour look up table and of expansion of the bits (completely over my head). If you alter line 50 to - 50 PRINT BIN$ POINT (B-1,173) it gets odder still.

The All Formats Fair was a bit of a disappointment (at the Novotel Hammersmith) the only SAM support was from SAM supplement and not a vestige of anything to do with the Spectrum.

The SAM Supplement said they were the only ones at the Birmingham show. They feel they are the sole carriers of the flame so to speak

Just a suggestion, could you ask your advertisers to add a flash on their adverts SEE YOU AT SUCH & SUCH SHOW. As you say too many shows for everybody to attend them all.

Two things to finish on, what does the Sambus do, and how does the parallel interface allow information to be read in "from almost any other computer".

If anyone wants to load and view their FLASH masterpiece all they need do is load "FILENAME" screen and there it is.

I look forward to FORMAT, long live SAM.

Yours sincerely Andrew Rycraft.

The special offer leaflet sent out with the October issue of FORMAT is now out of date. You can still get a 256K memory upgrade if your SAM is not already a 512K machine. See West Coast's advert in this issue.

I think you may kick yourself when you realize what was wrong with your program - add 5 PRINT as a first line and then run it.

Printing characters to the screen affects a 9 by 8 grid of pixels (8x8) if you set up to match the Spectrum. Therefore the first character printed - the zero - overwrote your carefully plotted colours.

Last year I asked for bugs and got none that were reproducible. There are some bugs in the ROM but using MasterDos (which I think everyone should) and/or MasterBasic cures all known ones.

As to shows - at the last Birmingham show SAMs were on sale, we were there with all the back issues of FORMAT and all the software we could take. Zat were the only other company to put in an appearance. But where were the customers? Ed.

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Dear Editor,

I am also writing to let you know I enjoy all the articles in FORMAT and also have a problem deciding the most or least liked articles for the

questionnaire.

I'm letting you know my intention, all being well, to attend your get-together in September.

Being an avid SF (and Fantasy as well) reading family I was surprised and pleased to read of your proposed SF magazine project in your May editorial, and wish you well.

Yours sincerely, Tony Windmill.
- - - - -

Dear Editor,

I would like to buy a copy of the 'Prince of Persia' game for the SAM. Are there any copies of other such games uncovered with 'Prince of Persia'? In particular, I am lead to believe that 'F16 Combat Pilot' was once produced for the Sam Coupe, but I don't know who originally sold that. I don't suppose you know where I could find a copy?

I'll just finish off by saying (writing?) how good I think FORMAT is. When I first subscribed (This is my first subscription), I expected it to be mostly Spectrum related, with a few corners filled with SAM Coupe stuff. However, I find that it is nearly all relevant to the SAM, as well as the Spectrum, and all of interest to me.

Yours sincerely, Graeme Taylor.

F16 was never finished - problems with programming meant delay after delay and eventually the project was dropped. Ed.
- - - - -

Dear Editor,

Thank you very much for the even better FORMAT! I have all the issues from Vol 1 No 1 and I have to say after the last issue, there are interesting articles in every issue too.

In the last issue, I found the article from Mr David Zambonini: FONT120 very interesting to create letters with accent in Hungarian. Unfortunately I do not know the SAM Basic and I have to rewrite it to the Spectrum 48K. I found two problems:-

1. The author says the keys Q, A, O and P are to move the cursor and the M places the dots, but I do not find any INKEY for the "M". All the other

characters - W, S and Z - are O.K. It should be in the PROC: tmp?

2. The second problem is how could I convert the BIN$ in the lines 580 - 620 and 680? I write a short routine to convert decimal numbers 0 - 256 to binary, but I do not overcome the lines 600 and 610.

Perhaps you or Kevin could give me some hints in his Help Pages! Looking for your help.

Yours sincerely, Istvan Ordog.

Not sure on the FONT120 keyboard reading but BIN$ is not a problem. BIN$ returns a string representation of the 0s and 1s. So the following would do the job:-

```
10 REM perform BIN$ in normal basic
20 INPUT "Enter a number (0-255) ";N
30 LET B$="" :REM clear result
40 FOR I=1 TO 8
50 LET B$=STR$ (INT (N/2)<>N/2)+B$
60 LET N=INT (N/2)
70 NEXT I
80 PRINT "The BIN$ of ";N;" is ";B$
90 GOTO 20
```

The real work is done by line 50 where a zero is added to the start of B$ if the current value of N if even (divisible by two with no remainder) or a one if it is odd. Run it through and see for yourself. The rest is just string slicing and array handling in the normal Spectrum/SAM way (I think). Ed.

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UNDERSTANDING DIGITAL ELECTRONICS

By:- Adrian Parker.

Did you manage to evaluate the expression I gave you last month?

Don't worry if you didn't, you'll soon have lots of practice at it. What you should have had was:-

A XOR B

A	B	E
0	0	0
0	1	1
1	0	1
1	1	0

As you can see, I have given this table the symbol XOR, which stands for Exclusive OR. As is evident from the truth table, this expression is true (ie the output is a 1), if and only if, one of the input expressions are true. This differs from the OR operator, which evaluates to true if either, or both of the inputs are true.

So how do we use these expressions in design? Well each of the expressions thus far described are readily available as electronic components, known as logic gates. These gates take electronic inputs, and provide an output which is a direct evaluation of the truth tables that have already been described. eg. If we have a two input AND gate, and we apply 5 Volts (true) to input A and 0 volts (false) to input B, then the output will be false (ie 0 Volts). This corresponds directly to the third horizontal line in our AND truth table (see earlier). Applying 5 Volts to both A and B would of course give 5 Volts out, as in our fourth line of the AND truth table. (I should make a point at this time that some reference books refer to the true and false states as ON and OFF, or HI and LOW respectively. For experience, we shall

interchange between terms freely.

Each of the expressions above has its own symbol and these are shown in below

2 Input AND gate

2 Input OR gate

NOT gate

2 Input XOR gate

Now you may be wondering why most of the above gates have been labelled as 'Two-input'. This simply informs you that there are only two inputs to the gate, whereas there could be any number. All of the simple gate truth tables that you will see will only have two inputs, as the more inputs,

the more input combinations there are, and the bigger the truth table becomes. Just out of interest, each extra input doubles the size of the truth table! Intuitively, you might guess that an eight input AND gate would only have a true output, if and only if all of its inputs were true (ie if A is true AND B is true AND C is true... etc) - and you would be correct, that's exactly what happens. You cannot have more than a one input 'NOT' gate though!

Right, where are we now? We know how our logic may be represented in terms of gates, but of what use is it? To understand this, we must look at the way in which numbers are represented in a microprocessor.

If you are following Carol Brooksbank's excellent course in machine code in this magazine, or if you have some experience in machine code, then this will be old hat to you already but please bear with me whilst I try to explain.

We have already mentioned that a microprocessor can be built out of logic gates. So how can it represent anything other than a zero or a one? Well, think about the way that we count, we only have ten digits (0,1,2....9), how do we show a number bigger than nine? Of course, we are so used to numbers, that we know the answer. When we run out of digits, we indicate this in the next column by another number. (Does anyone remember doing maths with 'Hundreds, Tens and Units' when they were in school, first learning to 'add up numbers') A similar idea exists inside the computer. However it doesn't have ten digits to play with, it has only two. So, to represent a number bigger than 1, it has to start producing numbers with more than one digit. This method of counting is called binary (as opposed to the decimal or denary system that we use for everyday counting), and each 'digit' is called a bit.

The first few binary and their decimal equivalents are listed below:-

Decimal	Binary	Decimal	Binary
0	0000	8	1000
1	0001	9	1001
2	0010	10	1010
3	0011	11	1011
4	0100	12	1100
5	0101	13	1101
6	0110	14	1110
7	0111	15	1111

So, for example, suppose we had four switches, which could connect each of four inputs to HIGH or LOW logic levels (5V or 0V), and we wanted to know when the number 15 was selected, in binary, on the switches (ie 1111, see above table). We could connect a four input AND gate with each of its inputs connected to a different one of the four switches, and referring to our truth table for an AND gate, the output of the gate would be HIGH. If, and only if, all of the inputs to the gate are high, ie 1111. Thus we would get a logical HIGH on the output of the AND gate when the binary equivalent of fifteen is input.

Now the computer uses this sort of representation for the memory addresses, and for the data that it transfers to and from the memory. So we could now detect when a particular address appears from the computer, and do something accordingly.

That seems like quite enough to absorb this month, next month we shall look at the actual physical gates, and an actual working example. See you next month.

TasChar Editor
Designing Characters For Tasword 2.

The program below will allow you to alter the 64 column character definitions used by Tasword. Now this might seem a bit dull - you can make one or two letters more readable - the really interesting bit is that you can also redefine the graphic characters. The significance of this is that each graphic character represents a printer code so for example, you can define one of the block codes to look like a 1/2, then get out your printer manual wipe off the dust, look up the correct code for a half and redefine the correct Tasword printer code. Now whenever you need a half in your text you just type the correct block graphics character, but instead of a black blob, a half sign actually appears on screen.

For anyone who wants to include mathematical notation in their texts, this will save them a lot of work but most printers also allow other characters to be printed using special codes. The ones I find exceptionally useful are the line graphics which actually allow me to put boxes around sections of text. For anyone else who still want to use the graphic codes as printer control codes, you can at least redefine the blocks into symbols that are a bit more memorable!

TASWORD 2 CHARACTER EDITOR

1) Clear character
2) Move to character
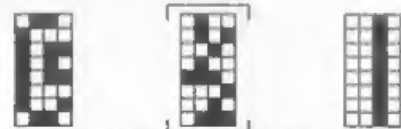
1) Re-load TASWORD character set
s) Save new character set

Fig.1 - The Edit Screen

If you haven't got Tasword, the program does use some useful tricks and so you can still learn something. Sinclair BASIC is not exactly known for its speed and so the main priority in writing the program was to make sure it ran at a reasonable rate.

Fig.1 shows the editing screen of the program. The lower display of all the characters is printed by first moving the system variable 'CHARS' (starting line 7100) and then just printing the normal character set. What happens is that the ROM routine takes letter data from the codes held in Tasword instead of from the character data in the ROM. The upper display is formed by converting decimal numbers from memory into a binary display. In line 10, a$ is the character to be printed as a binary zero, and b$ as binary one. The binary numbers 0 to 15 are then set up in a string array, d$, so to convert a number 'x' to binary (where x is between 0 and 15) just use:-

PRINT d$(x+1)

If you want to print numbers greater than 15 you can use the routine given at line 8500. Line 7100 just moves the udg's so they don't overwrite the Tasword code. The variable 'base' in line 2 is the address of the start of the letter data. This may have altered in later versions of Tasword so you may have to change it. Although this is unlikely, if you do need to alter it, it is just a matter of trial and error.

Now the control keys:-

Upper Display: 'q' Up
'a' Down
'o' Left
'p' Right
'm' Plot/Unplot

Lower Display: '5' Left
'6' Down
'7' Up
'8' Right

For those of you who don't have the old rubber keyboard, if you want to change the lower display keys to the arrow movement keys then change lines 215,220,225 & 230 from "5","8","7" and "6" to CHR$ 8, CHR$ 9, CHR$ 11 and CHR$ 10 respectively. Other than that, prompts are given to help you use it. The first time you run it, use RUN 9900 but if you then need to restart just use RUN.

```
1 CLEAR 29999
2 LET base=51184
4 POKE 23658,0
5 CLS #
6 PRINT AT 10,10; BRIGHT 1; INK 2;"
   PLEASE WAIT "
10 LET a$=CHR$ 144: LET b$=CHR$ 143
15 LET c$=CHR$ 133: REM cursor
20 GOSUB 8000
25 GOSUB 6000
30 GOSUB 7000
80 LET x=9: LET y=14
90 LET co=0
100 LET x1=INT (co/32)
105 LET y1=co-x1*32
108 LET x1=x1+18
110 PRINT AT x1,y1; INK 1; OVER 1;c$:
    LET fl=0: LET c=10
112 LET addr=base+co*8
115 LET ad=addr-8
118 IF co=0 THEN LET ad=base+888
120 FOR g=2 TO 29 STEP 12
125 FOR f=0 TO 7
130 PRINT AT f+9,g;d$(PEEK ad+1)
135 LET ad=ad+1
140 NEXT f
145 IF ad=base+896 THEN LET ad=base
148 NEXT g
150 PRINT AT x,y; INK (2 AND POINT (y
    *8+4,171-x*8)); BRIGHT 1; OVER 1;
    " "
155 GOTO 180
160 PRINT AT x,y; INK (2 AND POINT (y
    *8+4,171-x*8)); BRIGHT 1; OVER 1;
    " "
170 BEEP .005,10: LET c=5
180 LET i$=INKEY$
190 IF i$="m" THEN GOTO 300
195 IF i$="q" THEN GOTO 400
200 IF i$="a" THEN GOTO 500
205 IF i$="o" THEN GOTO 600
210 IF i$="p" THEN GOTO 700
215 IF i$="5" THEN GOTO 800
220 IF i$="8" THEN GOTO 900
225 IF i$="7" THEN GOTO 1000
230 IF i$="6" THEN GOTO 1100
235 IF i$="1" THEN GOTO 1200
240 IF i$="2" THEN GOTO 1300
245 IF i$="1" THEN GOTO 1400: REM low
    er-case L
250 IF i$="s" THEN GOTO 1500
280 LET c=c-1: IF c THEN GOTO 180
281 IF NOT fl THEN PRINT AT x1,y1; OV
    ER 1;c$
282 IF fl THEN PRINT AT x1,y1; INK 1;
    OVER 1;c$
283 LET fl=ABS (fl-1)
284 LET c=10: GOTO 180
298 GOTO 180
300 IF fl THEN PRINT AT x1,y1; INK 1;
    OVER 1;c$: LET fl=0: LET c=10
305 LET p=POINT (y*8+4,171-x*8)
310 IF p THEN PRINT AT x,y; BRIGHT 1;
    a$
320 IF NOT p THEN PRINT AT x,y; BRIGH
    T 1; INK 2;b$
330 PLOT OVER 1; INK 1;y1*8+y-10,184
    -x1*8-x
340 BEEP .005,10
350 LET a=172-x*8
360 POKE addr+x-9,8*POINT (116,a)+4*P
    OINT (124,a)+2*POINT (132,a)+POIN
    T (140,a)
370 GOTO 180
400 IF fl THEN PRINT AT x1,y1; INK 1;
    OVER 1;c$: LET fl=0: LET c=10
405 IF x=9 THEN GOTO 280
410 PRINT AT x,y; OVER 1;" "
420 LET x=x-1: GOTO 160
500 IF fl THEN PRINT AT x1,y1; INK 1;
    OVER 1;c$: LET fl=0: LET c=10
505 IF x=16 THEN GOTO 180
510 PRINT AT x,y; OVER 1;" "
520 LET x=x+1: GOTO 160
600 IF fl THEN PRINT AT x1,y1; INK 1;
    OVER 1;c$: LET fl=0: LET c=10
605 IF y=14 THEN GOTO 180
610 PRINT AT x,y; OVER 1;" "
620 LET y=y-1: GOTO 160
700 IF fl THEN PRINT AT x1,y1; INK 1;
    OVER 1;c$: LET fl=0: LET c=10
705 IF y=17 THEN GOTO 180
710 PRINT AT x,y; OVER 1;" "
720 LET y=y+1: GOTO 160
800 LET co=co-1
810 IF co=-1 THEN LET co=111
820 IF NOT fl THEN PRINT AT x1,y1; OV
    ER 1;c$
830 GOTO 100
```

```
900 LET co=co+1
910 IF co=112 THEN LET co=0
920 IF NOT fl THEN PRINT AT x1,y1; OV
    ER 1;c$
930 GOTO 100
1000 LET co=co-32
1010 IF co<0 THEN LET co=co+96+(32 AND
     co<-16)
1020 IF NOT fl THEN PRINT AT x1,y1; OV
     ER 1;c$
1030 GOTO 100
1100 LET co=co+32
1110 IF co>111 THEN LET co=co-96-(32 A
     ND co>127)
1120 IF NOT fl THEN PRINT AT x1,y1; OV
     ER 1;c$
1130 GOTO 100
1200 PRINT AT x1,y1; INK 1;c$: LET fl=
     1
1205 BEEP .005,10: LET c=5
1210 FOR f=0 TO 7
1220 PRINT AT 9+f,14;a$+a$+a$+a$
1230 POKE addr+f,0: NEXT f
1240 GOTO 150
1300 IF NOT fl THEN PRINT AT x1,y1; OV
     ER 1;c$
1305 BEEP .005,10
1310 INPUT "Enter a character: "; LINE
     i$
1320 IF LEN i$<>1 THEN BEEP .1,-10: GO
     TO 1310
1330 LET co=CODE i$-32
1340 IF co<0 OR co>111 THEN BEEP .1,-1
     0: GOTO 1310
1345 REM Return to L mode
1350 POKE 23617,0: POKE 23658,0
1360 GOTO 100
1400 PRINT #1;AT 0,4; BRIGHT 1; INK 1;
     " LOADING OLD CHARACTERS "
1410 GOSUB 1450
1420 LOAD d*"TASWORD_C"CODE 50816
1430 GOSUB 7100: GOTO 80
1450 PRINT #1;"insert TASWORD disc, pr
     ess a key"
1460 BEEP .1,10
1470 PAUSE 1: PAUSE 0
1480 INPUT "": RETURN
1500 PRINT #1;AT 0,4; BRIGHT 1; INK 1;
     " SAVING NEW CHARACTERS "
1510 GOSUB 1450
1520 SAVE d*"TASWORD_C"CODE 50816,1471
     9
1530 GOSUB 7100: GOTO 80
6000 REM Move UDG's to prevent
6001 REM overwriting TASWORD
6005 POKE 23675,48: POKE 23676,117
6010 RESTORE 6050
6015 FOR f=USR "a" TO USR "b"-1
6020 READ i: POKE f,i: NEXT f
6040 RETURN
6050 DATA 255,128,128,128,128,128,128,
     128
7000 CLS #
7005 FOR f=16 TO 255 STEP 96
7010 PLOT f,103
7020 DRAW 32,0: DRAW 0,-64: DRAW -32,0
     : DRAW 0,64
7030 NEXT f
7040 PLOT 104,100: DRAW 0,8: DRAW 48,0
     : DRAW 0,-8
7050 PLOT 104,42: DRAW 0,-8: DRAW 48,0
     : DRAW 0,8
7055 PRINT AT 0,2; BRIGHT 1; INK 2;" T
     ASWORD 2 CHARACTER EDITOR "
7060 PRINT AT 2,0;"1) Clear character"
7070 PRINT AT 3,0;"2) Move to characte
     r"
7080 PRINT AT 5,0;"1) Re-load TASWORD
     character set"
7090 PRINT AT 6,0;"s) Save new charact
     er set"
7100 LET a=INT (base/256)
7110 POKE 23606,base-a*256
7120 POKE 23607,a-1
7130 PRINT AT 18,0;
7140 PRINT z$
7141 POKE 23607,a+2
7142 PRINT z$( TO 16)
7160 POKE 23606,0
7170 POKE 23607,60
7190 RETURN
8000 RESTORE 9000: DIM d$(16,4)
8010 LET w$=a$+a$: LET x$=a$+b$
8020 LET y$=b$+a$: LET z$=b$+b$
8030 FOR f=1 TO 16
8040 READ d$(f): NEXT f
8050 LET z$=""
8060 FOR f=32 TO 127
8070 LET z$=z$+CHR$ f
8080 NEXT f
8090 RETURN
8500 LET x1=INT (x/16)
8510 LET x2=x-x1*16
8520 LET x$=d$(x1+1)+d$(x2+1)
8530 RETURN
9000 DATA w$+w$,w$+x$
9010 DATA w$+y$,w$+z$
9020 DATA x$+w$,x$+x$
9030 DATA x$+y$,x$+z$
9040 DATA y$+w$,y$+x$
9050 DATA y$+y$,y$+z$
9060 DATA z$+w$,z$+x$
9070 DATA z$+y$,z$+z$
9900 CLEAR 29999: CLS #
9901 PRINT BRIGHT 1; INK 1;AT 0,0;"Lo
     ading TASWORD 2 character set"
```

```
9902 GOSUB 1450
9903 LOAD d**"TASWORD C"CODE 50816: REM
     use the name of your tasword mac
     hine code file.
9904 RUN
9999 CLEAR : SAVE d**"TAS-CHAR" LINE 99
     00
```

Now a little example. Fig.2 shows the Printer Control Codes screen from Tasword 2. You get to it by taking option G from the main menu. As you will see I have set each of the codes to one of the special characters in the Extended IBM character set. 171 gives the ½ sign while 195 gives ├ which is one of the box drawing characters (see the lower part of Fig.1 also).

Fig.2 Taswords Printer Control Chars.

Now, with a little practise, you can draw up a screen in TW2 like that shown in Fig.3 below. What you get out on paper should be exactly like what you typed in.

Fig.3 An Example Screen.

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